

Introduction to Artificial Intelligence

AI

What is intelligence?

From the dictionary...

- The capacity to acquire and apply knowledge
- The faculty of thought and reason
- Superior powers
- Information (especially secret information)

Let's observe some intelligent behaviors

Intelligent behaviors (by Joshua)

- Game playing (tic-tac-toe, global thermonuclear war)
- Natural language understanding
- Dialogue management
- Learning ("Learn, dammit!")
- ...

Intelligent behaviors (by C3PO & R2D2)

- Vision/perception
- Grasping/manipulation
- Navigation
- Speech recognition
- Emotion (e.g., fear)

How do you know if an entity is intelligent?

The Turing Test

- "Can a machine think?" "If a machine could think, how could we tell?"
- Based on the "the imitation game"
- The Loebner prize awards the "most human-like" computer. It is the first formal implementation of the Turing Test.
- Roots of the field of Natural Language Processing



- CAPTCHA
- Completely Automated Public Turing Test for Telling Computers and Humans Apart



What is the goal of research in artificial intelligence?

- Not to create C3PO ☹
- Engineering: create artifacts that display useful intelligent behavior
- Science (1): understand intelligence
- Science (2): understand human intelligence

Some questions AI might try to answer

- Given these symptoms, what illness do I have?
- What is the best way to go from Ithaca to Aswan, Egypt?
- Is the next hurricane/earthquake/... the big one?

Real AI (right now)

- **Robots!** (Mars rovers, DARPA grand challenge, Roomba, ...)
- **Game playing** (world-class chess, checkers, backgammon, Jeopardy, ...)
- **Language technology** (speech recognition, machine translations, ...)
- ...

Extremely brief history of AI

- Alan Turing's 1950 paper "Computing Machinery and Intelligence"
- "Artificial Intelligence"—coined in 1956
 - Use of computers for modeling certain problem-solving tasks that were, prior to the invention of the computer, thought to be uniquely human.
- **Classic AI:** (60s-80s) models of intelligence, search, games, knowledge representation
- **Empirical AI:** (90s-present) learning, data-driven, probabilistic/statistical

AI topics in this course

(There's not enough time for all of AI!)

- Natural language understanding
Computational linguistics
- Machine learning
- Information retrieval
- Historical, cultural, and ethical issues

What are some ethical issues with AI?